

**NICOTIANA WUTTKEI (SOLANACEAE), A NEW SPECIES
FROM NORTH-EASTERN QUEENSLAND WITH
AN UNUSUAL CHROMOSOME NUMBER**

J.R. Clarkson

Botany Branch, Department of Primary Industries, Mareeba, Qld 4880,
Australia

and D.E. Symon

c/-State Herbarium, Botanic Garden, North Terrace, Adelaide, SA
5000, Australia

Summary

Nicotiana wuttkei is described as new and compared with *N. suaveolens* Lehm. It is known only from a single population on the Atherton Tablelands in north-eastern Queensland. The haploid chromosome number $n = 14$ is the first record of this number for the genus *Nicotiana* worldwide.

Introduction

In 1967 Dr Herb Wuttke, a tobacco plant breeder with the Commonwealth Scientific and Industrial Research Organisation, Mareeba, discovered unusual plants of a *Nicotiana* species on the Atherton Tableland. Until then the only species thought to occur in north-eastern Queensland were *N. debneyi* Domin and *N. megalosiphon* Van Heurck & Muell. Arg. (Burbidge 1960). The Atherton Tableland plant was readily distinguished from the former by its staminal arrangement and from the latter by its very much shorter corolla tube. It was found to be resistant to both Queensland strains of blue mould (*Peronospora hyoscyami* De Bary), a serious disease of cultivated tobacco, and it was soon introduced into the blue mould resistance breeding programme. On and off for almost twenty years Dr Wuttke and then his successor in the breeding programme, Mr Vern Hansen, attempted to establish the true identity of the unplaced plant. The names *N. suaveolens* Lehm. and *N. exigua* H. Wheeler (now considered by Horton (1981) to be a synonym of *N. suaveolens*) were applied with some qualification by botanists at both BRI and CANB where material was sent for identification. Burbidge (in litt. 1967) suggested that the plant might belong to a new species but Horton, who saw at least one collection (*Wuttke* [AQ 38517] BRI) of glasshouse grown material at BRI and annotated the sheet "appears to be *N. suaveolens* but corolla tube unusually short", did not cite any material in her revision (Horton 1981). At the request of Mr Hansen, one of us (J.C.) critically examined glasshouse grown material, recollected the plant in the field and, on the basis of morphological, agronomic and pathological information combined with reference to the known patterns of distribution of *Nicotiana* in Australia, was persuaded that Wuttke's plant represented an undescribed species. This finding was reinforced when the second author obtained a haploid chromosome number of $n = 14$ for the plant. As a tobacco variety with blue mould resistance derived from this taxon is close to commercial release, it is felt that formal recognition of it at this stage is warranted.

Taxonomy

Nicotiana wuttkei J. Clarkson et Symon, **sp. nov.** similis *N. suaveolenti* Lehm. sed floribus minoribus et chromosomatum numero $n = 14$ differt. **Typus:** Queensland. COOK DISTRICT: 3 km from the Atherton to Ravenshoe road on the road to Tumoulin, 17°30'S, 145°28'E, 12 September 1984, *J.R. Clarkson* 5549 (holo: BRI; iso: AD,CANB,DNA,K,L,MBA,MO,QRS,PERTH).

Annual herb to 0.8(-1) m tall with one or a few stems from ground level. Indumentum on bracts, pedicels and calyx sparse to dense, a mixture of long, multicellular, globular-headed trichomes and short, unicellular, globular-tipped hydathodes; young growth sparsely to densely pubescent with long, eglandular, multicellular trichomes, glabrescent except for lower portions of stems and petioles of lower leaves. Leaves both radical and cauline, occasionally mostly radical, petiolate; lamina of lower leaves ovate or elliptic

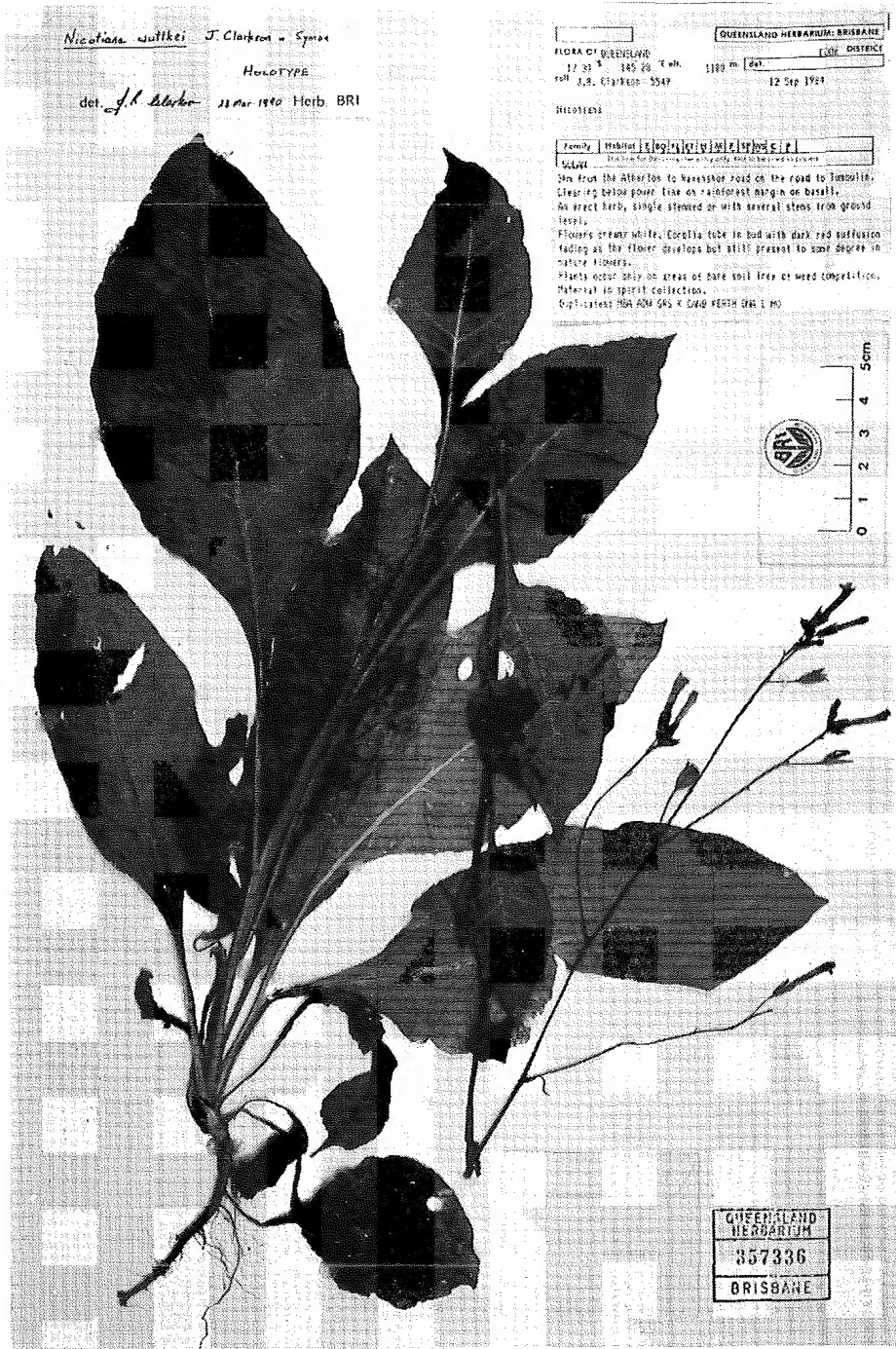


Fig. 1. Holotype of *N. wutkei* (Clarkson 5549).

becoming lanceolate or linear-lanceolate in the upper cauline positions, the basal ones 10–18 cm long, 4–7.5 cm wide occasionally reaching 28–34 cm × 14–16 cm in well grown individuals, those of the mid stem region 8–10 cm × 3.5–5 cm; apex acute to acuminate; base cuneate to attenuate; petiole 2–5(–7) cm long, narrowly winged by the decurrent leaf lamina. Inflorescence an elongate, sparsely branched panicle occupying 1/2 to 2/3 of the length of the stems; bracts linear to linear lanceolate, to 2–5 cm long; pedicels 12–15(–20) mm long in fruit. Calyx 7–10 mm long; lobes linear-lanceolate, equal to sub-equal, fused for about 1/2 their length. Corolla tube 16–18 mm long, c. 3 mm wide at the top of the calyx; tube proper slightly narrower than the throat cylinder; throat cup distinct, symmetrical, c. 3.5 mm diameter; corolla limb c. 9 mm diameter, closing in bright sunlight; lobes emarginate, fused for 1/3–1/2 their length. Upper 4 stamens level in throat cup, included; filaments free from corolla tube for distal 1–1.5 mm; fifth stamen c. 25 mm below the upper four, free portion of filament c. 10 mm long. Capsule ovate, 8–9 mm long, shorter than the calyx. Seeds reniform, 0.8–0.9 mm long; testa with serpentine wrinkles. **Figs 1 & 2.**

Specimens examined: Queensland. COOK DISTRICT: Tumoulin, to Atherton road, 11.2 km from Tumoulin, Apr 1978, Hansen [AQ 257106] (BRI); 3 km from Atherton to Ravenshoe road on the road to Tumoulin, Sep 1984, Clarkson 5549 (AD,BRI,CANB,DNA,K,L,MBA,MO,QRS,PERTH); Southedge Research Station near Mareeba (cultivated), Jan 1984, Clarkson 5122 (AD,BRI,MBA,QRS). MORETON DISTRICT: Tobacco Research Station, 2 ml [3.2 km] N of Beerwah (cultivated), Sep 1971, Wuttke [AQ 038517] (BRI).

Distribution and habitat: Known only from the type locality between Atherton and Ravenshoe on the Atherton Tableland, north Queensland. The plant occurs on the margins of closed forest on soils derived from basalt. It favours open ground free from competition from grass and weeds. The numbers of plants within the population at any one time appears to be very much dependant on the degree of disturbance and the amount of bare soil.

Conservation status: Because of its restricted distribution this species rated is 2K (under the name *Nicotiana* sp. 'Tomoulin') by Thomas and McDonald (1989).

Chromosome number: $n = 14$, determined from meiotic pollen mother cells in plants cultivated from seed from Clarkson 5549. In view of the new low number further counts are highly desirable.

Etymology: The species is named for Dr Herb Wuttke who spent many years as a plant breeder working with *Nicotiana* species and who found the first plants.

Notes: Chromosome numbers and their evolution in the genus *Nicotiana* were discussed at length by Goodspeed (1954). Section *Suaveolentes*, to which the 17 previously known Australian endemic species are referred, contains an almost complete aneuploid series of $n = 16$ to $n = 24$ from which, since Burbidge (1960) recorded the haploid number 23 for *N. umbratica* and *N. cavicola*, only $n = 17$ remains unknown. The discovery of a haploid number of 14 for *N. wuttkei* is interesting in that it falls outside this series and is the first record of 14 pairs of chromosomes for the genus worldwide.

The following modification will enable the species to be keyed out in the key to species of *Nicotiana* in Volume 29 of Flora of Australia (Purdie *et al.* 1982).

- 19 Corolla-tube usually more than 18 mm long, distinctly broadening up to the limb *N. suaveolens*
- 19: Corolla-tube usually 8–18 mm long, not distinctly broadening up to the limb **19a**
- 19a Radical leaves spatulate or oblanceolate, seeds C-shaped *N. goodspeedii*
- 19a: Radical leaves ovate or elliptic, seeds reniform *N. wuttkei*

Acknowledgements

We are indebted to our colleagues for their help and assistance in particular Barbara Randell, formally of AD, who provided the chromosome count and Hans Dillewaard of the Queensland Herbarium who prepared the scanning electron micrograph

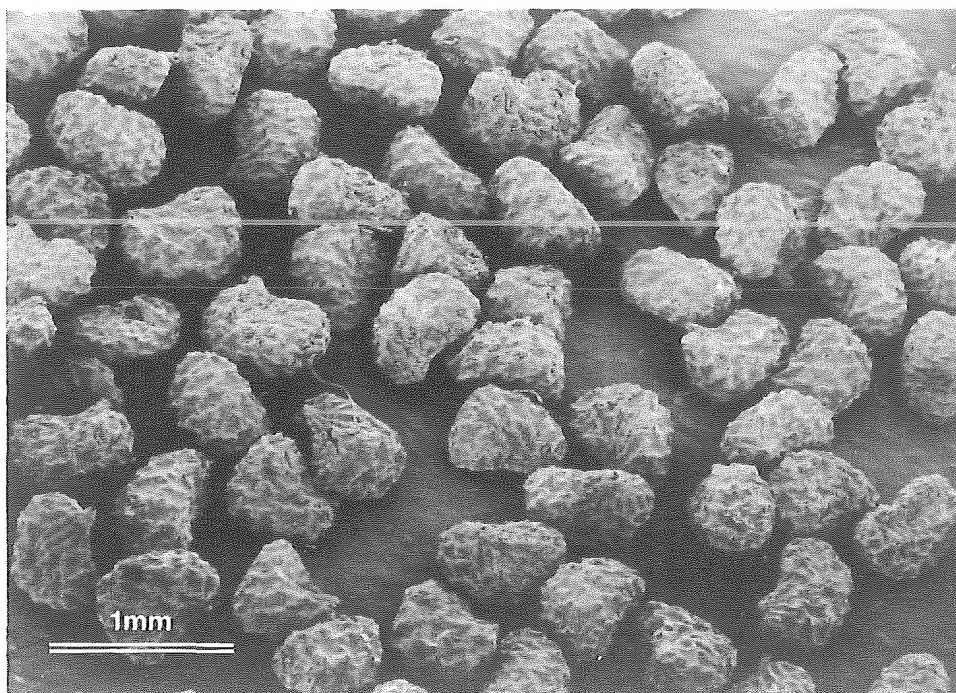


Fig. 2. Scanning electron micrograph of seeds of *N. wutkei*. (Seed from plants cultivated from Clarkson 5549).

of the seeds and photographed the holotype. Les Pedley and Rod Henderson critically read the manuscript and offered constructive comments. Finally we wish to acknowledge Vern Hansen of the Queensland Department of Primary Industry's Southedge Research Station for his useful comments on the behaviour of the new species and its close relatives in the blue mould resistance breeding programme.

References

- BURBIDGE, N.T. (1960). The Australian species of *Nicotiana* L. (Solanaceae). *Australian Journal of Botany* 8: 342-380.
- HORTON, P. (1981). A taxonomic revision of *Nicotiana* (Solanaceae) in Australia. *Journal of the Adelaide Botanic Gardens* 3: 1-56.
- PURDIE, R.W., SYMON, D.E. & HAEGI, L. (1982). *Nicotiana*. In A.S. George (ed.), *Flora of Australia* 29: 38-57. Canberra: Australian Government Publishing Service.
- THOMAS, M.B. & McDONALD, W.J.F. (1989). *Rare or Threatened Plants of Queensland*, 2nd edition. Brisbane: Queensland Department of Primary Industries.

Accepted for publication 10 January 1991